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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/699,080

10/26/2000

Philip J. Kuekes

10981967-1

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7590

09/02/2004

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Intellectual Property Administration  
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EXAMINER

WILLE, DOUGLAS A

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 09/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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# Office Action Summary

Application No.

09/699,080

Applicant(s)

KUEKES ET AL.

Examiner

Douglas A Wille

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 16-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 16 - 30 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.
3. Claim 16 refers to two crossed wires with one having a functional group attached to form a junction but there is no description of how the wires are formed, how the coating is performed or how the wires are brought and held in proximity. While it is suggested that in the specification that a paper by Guo shows a method of making a quantum wire this is not enabling for the whole device and raises the question of the effect of the substrate of the claimed operation. One of the functional groups mention in the specification is ammonia. How is this material placed and maintained in contact with the wires? This is a problem since it is not a solid. How close must the wires be and what is the tolerance? Do the wires have to be within a separation that is on the order of a molecular diameter? How would this be accomplished? What are the design principles that would apply to creating a real device? Will the functional groups react with the semiconductor or metal quantum wires and if so what happens to the integrity of the quantum wire structure? No example of a real structure with real materials is given and it is left up to the reader to invent a representative structure.

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To provide such a structure would involve considerable design and experimental effort and as such the disclosure is not enabling.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 20 and 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
6. Claim 20 states that a base region is induced in one wire. Where is the connection to the base region? Note that if one wire induces a npn in the other that the reciprocal effect is a pnp which form the possible connection.
7. Claim 24 refers to forming a first portion that is electrically insulating which extends from the metal wire. This is not understood. How is the electrical insulation formed and how does it extend from the wire? A second portion is not understood. Where is this second portion? The claim states that a gate region is induced. Does this mean that a channel region is induced? Correction is required.

***Claim Rejections - 35 USC § 102***

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
9. Claims 16 - 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Meyer et al.

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10. With respect to claim 16, Meyer et al. show a quantum effect device (see cover Figure, Figure 3a, Figure 4 and column 3, line 50 et seq.) with crossed quantum wires where one wire is a semiconductor and the other wire may be regarded as the metal gate 32 or a combination of the metal gate and a part of the semiconductor layers. Note that since the semiconductor layers transfer charge due to the band offset effects, they perform modulation doping and are effectively the functional group. Note that all materials are either a Lewis acid or base.
11. With respect to claims 17 and 18, the spacing is inherently nanoscopic.
12. With respect to claims 19, 23 and 27, the quantum wire is a semiconductor which can be either polarity and the gate, as is standard in the art, can be a metal or a doped semiconductor with the selection being determined by the required work function and is a matter of design choice.
13. With respect to claims 20 and 22, the gate structure will induce a region of opposite type under it and therefore defines a pnp or npn structure.
14. With respect to claim 24, the gate will induce a channel region. Note that a gate region is as region where a gate is located and it appears that applicant is referring to a channel region rather than a gate region.
15. With respect to claims 25 and 26, either polarity can be used and both n-channel and p-channel devices are standard in the art.
16. With respect to claim 28, the limitation is a functional limitation which does not carry weight in a claim drawn to a structure.

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17. With respect to claims 29 and 30, Meyer et al. shows a transistor and a switching function is inherent in a transistor.
18. Claims 16 - 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Frazier et al.
19. With respect to claim 16, Frazier et al. show a quantum effect device (see Figure 3, and column 7, line 20 et seq.) with a quantum wire 86, 90,92 and a wire 96 where one wire is a semiconductor and the other wire is a metal gate; however, the gate, as is standard in the art, can be a metal or a doped semiconductor with the selection being determined by the required work function as is a matter of design choice. Note that since the semiconductor layers transfer charge due to the band offset effects, they perform modulation doping and are effectively the functional group. Note that all materials are either a Lewis acid or base.
20. With respect to claims 17 and 18, the spacing is inherently nanoscopic.
21. With respect to claims 19, 23 and 27, the quantum wire is a semiconductor which can be either polarity and the gate, as is standard in the art, can be a metal or a doped semiconductor with the selection being determined by the required work function as is a matter of design choice.
22. With respect to claims 20 and 22, the gate structure will induce a region of opposite type under it and therefore defines a pnp or npn structure.
23. With respect to claim 24, the gate will induce a channel region. Note that a gate region is as region where a gate is located and it appears that applicant is referring to a channel region rather than a gate region.
24. With respect to claims 25 and 26, either polarity can be used and both n-channel and p-channel devices are standard in the art.

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25. With respect to claim 28, the limitation is a functional limitation which does not carry weight in a claim drawn to a structure.
26. With respect to claims 29 and 30, Frazier et al. show a transistor and a switching function is inherent in a transistor.

***Information Disclosure Statement***

1. Applicant has submitted an IDS for another application and it is therefore not being considered.

***Response to Arguments***

2. Applicant's arguments filed 7/15/04 have been fully considered but they are not persuasive.
3. Applicant provides repeated references to rejection of another application. Since the present Application, 09/699,080 is being considered here, only comments addressed to that Application will be considered.
4. Applicant states that the Examiner has made the statement that '048 is not related to the present application. No such statement has been made by Examiner in this case (see the non-final rejection of record).
5. Applicant has provided a reference to application 09/280,048 on page 7 of the specification. This Application is totally unrelated to the present application. In Applicant's remarks reference is made (see bottom of page 4) to application 09/280,188. Perhaps Applicant will clarify what Application is meant.
6. Applicant repeatedly states that Examiner is attempting to insert language into the claims that is simply not there. Applicant is informed that support for the claims must be provided in the

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specification and such support is not provided in Application 09/280,048. This is not inserting language into the claims.

7. Applicant repeatedly refers to another rejection and it is not possible to sort out what applies to this Application and what applies to another and is not further addressed.

8. Applicant states that the Meyer et al. device depends on resonant tunneling and that Applicant's device is a transistor. First, note that the Meyer et al. device is a transistor (see the title and note that there is a gate). Second, it is common in the semiconductor art to provide an EEPROM transistor device that depends on Fowler-Nordheim tunneling. Such a device is a transistor and employs tunneling and thus tunneling is not a bar to transistor action.

9. Applicant states that Meyer et al. does not describe a Lewis acid or base but note that everything is either a Lewis acid or base.

10. Applicant states that Frazier et al. does not describe a Lewis acid or base but note that everything is either a Lewis acid or base.

### ***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,



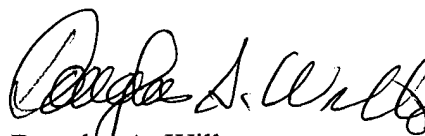
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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas A Wille whose telephone number is (571) 272-1721. The examiner can normally be reached on M-F (6:15-2:45).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'Douglas A. Wille', is positioned above the printed name and title.

Douglas A. Wille  
Patent Examiner

daw  
September 1, 2004